
5`i a]b]^[b`Ui a]b]Yj Y`n`h]bY!`5 bcX]nUWYU!`% "XY`A YfYbY`nbU]b]WcXVc`bcg]j
Ui a]b]Yj]\`dcj fy]b`n`[cb]cZlca Yfca `U]`dcYbcg]Uj`Yb]a `[cb]cZlca Yfca

Aluminium and aluminium alloys - Anodizing - Part 13: Measurement of reflectance characteristics of aluminium surfaces using a goniophotometer or an abridged goniophotometer

Aluminium und Aluminiumlegierungen - Anodisieren - Teil 13: Messung der Reflexionseigenschaften von Aluminiumoberflächen mit vereinfachtem oder Präzisions-Goniophotometer
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Aluminium et alliages d'aluminium - Anodisation - Partie 13: Mesurage des caractéristiques de réflectivité des surfaces d'aluminium à l'aide d'un goniophotometre simplifié ou normal
SIST EN 12373-13:2002
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ICS:

| | | |
|-----------|---------------------------------|--------------------------------|
| 25.220.20 | Površinska obdelava | Surface treatment |
| 77.120.10 | Aluminij in aluminijeve zlitine | Aluminium and aluminium alloys |

SIST EN 12373-13:2002**en**

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Aluminium and aluminium alloys - Anodizing - Part 13:
Measurement of reflectance characteristics of aluminium
surfaces using a goniophotometer or an abridged
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13: Messung der Reflexionseigenschaften von
Aluminiumoberflächen mit vereinfachtem oder Präzisions-
Goniophotometer

This European Standard was approved by CEN on 27 July 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

<https://standards.iteh.ai/catalog/standards/sist/640d24b3-8580-4d7c-8a59-312401780140/en-12373-13:2000>

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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[Application and accuracy of goniophotometers](#)
[804b-f9781020d072/sist-en-12373-13-2002](#)

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 132 "Aluminium and aluminium alloys", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2001, and conflicting national standards shall be withdrawn at the latest by February 2001.

It is based upon ISO 7759:1983.

In this standard annex A is informative.

EN 12373, Aluminium and aluminium alloys — Anodizing, comprises the following parts:

- Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium
- Part 2: Determination of mass per unit area (surface density) of anodic oxidation coatings – Gravimetric method
- Part 3: Determination of thickness of anodic oxidation coatings – Non-destructive measurement by split beam microscope
- Part 4: Estimation of loss of absorptive power of anodic oxidation coatings after sealing by dye spot test with prior acid treatment
- Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of admittance
- Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment
- Part 7: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment
- Part 8: Determination of the comparative fastness to ultra-violet light and heat of coloured anodic oxidation coatings
- Part 9: Measurement of wear resistance and wear index of anodic oxidation coatings using an abrasive wheel wear test apparatus

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- Part 10: Measurement of mean specific abrasion resistance of anodic oxidation coatings using an abrasive jet test apparatus
- Part 11: Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20°, 45°, 60° or 85°
- Part 12: Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments
- Part 13: Measurement of reflectivity characteristics of aluminium surfaces using a goniophotometer or an abridged goniophotometer
- Part 14: Visual determination of image clarity of anodic oxidation coatings – Chart scale method
- Part 15: Assessment of resistance of anodic oxidation coatings to cracking by deformation
- Part 16: Check for continuity of thin anodic oxidation coatings – Copper sulfate test
- Part 17: Determination of electric breakdown potential
- Part 18: Rating system for the evaluation of pitting corrosion – Chart method
- Part 19: Rating system for the evaluation of pitting corrosion – Grid method

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The visual appearance of metallic finishes is important commercially on metals for automotive, architectural, and other uses where these metals undergo special finishing processes to produce the appearance desired. For end-products which use such finished metals, it is important that parts placed together have the same appearance. Specular reflectance is one of the properties measured, but additional measurements are usually required to identify adequately the appearance of any metal surface. In the method described in this standard, several important aspects of the surface appearance are identified and can be measured. Those surfaces having identical sets of numbers will normally have the same reflectance characteristics and the same appearance (see [1], [2], [3]).

1 Scope

This part of this European Standard specifies a method for the measurement of the reflectance characteristics of high-gloss anodized aluminium surfaces.

The method described is also suitable for the measurement of the reflectance characteristics of other high gloss metal surfaces.

The method is not suitable for diffuse-finish metal surfaces and does not measure colour.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For updated references the latest edition of the publication referred to applies (including amendments).

CIE 38:1977, Radiometric and photometric characteristics of materials and their measurement.¹

¹ Available from the Bureau Central de la CIE, 52 Boulevard Malesherbes, 75008, Paris, France.

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

3.1

goniophotometer

instrument in which specimens can be illuminated at selected angles of incidence and in which the light reflected in different directions can be measured

3.2

abridged goniophotometer

goniophotometer having a fixed angle of incidence and specific fixed direction(s) at which light reflected from the specimen can be measured

NOTE The instrument described in this standard uses an angle of incidence of 30° and directions for measurement of reflected light of -30° , $-30^\circ \pm 0,3^\circ$, $-30^\circ \pm 2^\circ$, $-30^\circ \pm 5^\circ$, and -45° , although some suitable instruments can measure only on one side of the 30° angle.

4 Principle

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4.1 Visual appearance of the anodized aluminium surface is characterized by means of six different properties (see 4.2 to 4.7) of the reflected light coming from a narrow source beam incident on the surface at an angle of 30° .

4.2 Specular reflectance R_s is measured at 30° to the specimen normal using narrow source and receiver field angles ($0,50^\circ$ wide, maximum in the plane of the angle of reflection).

4.3 Distinctness-of-reflected-image R_i is determined from the slightly off-specular reflectance ($R_{30 \pm 0,3}$) measured at $29,7^\circ$ and $30,3^\circ$, the instrument integrating the light received from both of these apertures.

4.4 Narrow angle haze H_n is determined from reflectance measurements taken at angles of 28° or 32° or both, i.e. at 2° away from the specular beam ($R_{30 \pm 2}$).

4.5 Wide angle haze H_w is determined from reflectance measurements taken at angles of 25° or 35° or both, i.e. 5° away from the specular beam ($R_{30 \pm 5}$).

4.6 Diffuseness R_d is determined from a reflectance measurement taken at an angle of 45° , i.e. 15° away from the specular beam (R_{45}).

4.7 Directionality D_h of the surface is derived from the ratio of two measurements of the narrow angle haze H_n , the first taken when the incident light is perpendicular to the direction of the surface texture and the second when the incident light is parallel to the surface texture i.e. the rolling, extrusion or machining direction.

